

Vocia®

LSI-16

Operation Manual

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VOCIA LIFE SAFETY INTERFACE 16 (LSI-16)



The LSI-16 is a networked device that serves as an interface between a Vocaia system and emergency or fire alarm systems. The LSI-16 may accept up to three sources of power: main power is from an external, standards compliant, battery backed 24V DC source but the LSI-16 can also utilize Power over Ethernet (PoE) delivered via either of its two network ports. The device is equipped with parallel I/O ports for direct interface to fire and emergency control equipment. The LSI-16 uses Ethernet-based control protocols to function within a Vocaia system.

FEATURES

- Parallel I/O ports for direct interface with fire alarm and emergency equipment
- Emergency control of four zones
- Eight monitored outputs and eight control inputs
- Redundant network connection and power supply options
- Option module for added control of I/O
- Power and data over a single Ethernet cable
- Local storage of configuration data
- Rotary switches for unit identification
- Status LEDs
- Rack mountable (1RU)
- **CE** marked and **RoHS** compliant
- Covered by Biamp Systems' warranty

LSI-16 FRONT PANEL

Setup and Use

The Vocia software provides an intuitive interface for configuration and programming of the LSI-16. The information supplied by this manual relates to physical connections and assignment. For more details on configuration of the LSI-16, please consult the Vocia Software Help File.

The LSI-16 governs the emergency functions of a Vocia system, monitoring and reporting faults and alarm conditions through indicators and the system software. Incorrect configuration, removal, or non-installation of some system elements may result in the LSI-16 reporting a fault or alarm condition. This is normal operation. For correct, fault-free operation, inputs and outputs must be connected to the LSI-16 as detailed below, the LSI-16 must detect that it is the only such device installed in the Paging World, and the system must be correctly configured and correctly operating.

Front Panel

The LSI-16 features twenty-three LEDs on the front plate (from left to right):



(LED 1) Power

The first LED on the left will illuminate green if the unit is powered by main or PoE supplies.

(LED 2) General Alarm

This LED will illuminate red if the LSI-16 receives an alarm signal from an external emergency detection system (e.g. a fire alarm system) via the Alarm inputs to the LSI-16. This LED indicates the general alarm state:

1. Solid red - The LSI-16 has received an alarm signal from an external emergency detection system (e.g. fire alarm system).
2. Flashing red - The LSI-16 has received a general alarm silence from an external emergency detection system (e.g. fire alarm system).

(LED 3) General Fault

This LED will illuminate yellow if there is a fault in the system that does not affect the delivery of a warning message.

(LED 4) Power Supply Fault

This LED will illuminate yellow if LSI-16 is operating on a PoE supply but the main 24V supply fails or an external power supply fault is signaled to the LSI-16.

(LED 5) Protection Fault

This LED will illuminate yellow if a system amplifier channel fails and this failure does not prevent an emergency zone voice announcement. Note: failures that do affect emergency zone voice announcements will result in a system fault.

(LED 6) Path Fault

This LED will illuminate yellow if a fault in a transmission path is detected. The path integrity is tested from microphone capsule to end of loudspeaker lines if optional Vocia ELD-1 devices are fitted at the end of the loudspeaker lines.

(LED 7) System Fault

This LED indicates the integrity of the system:

1. Flashing yellow - The unit has a fault that may prevent the reliable operation of life safety announcement functions.
2. Not illuminated - The unit is operational without any faults that may prevent reliable operation of life safety announcement functions.

LSI-16 FRONT PANEL

(LED 7) System Fault (continued)

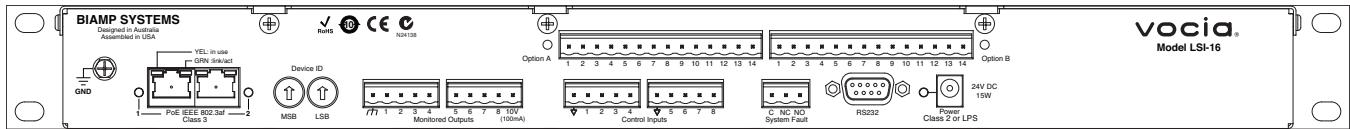
Because it indicates a potentially serious condition, the presence of a System Fault extinguishes indicators for PSU, Path and Protection faults so as to focus attention on the primary fault. However, individual PSU, Path and Protection faults are still shown in the system software and signaled to individual fault outputs as described below.

The LSI-16 will always power up in the system fault condition. Manual intervention is required to take the LSI-16 out of this condition. Note: this power up condition does not prevent emergency zone voice announcements provided that the system is operating reliably.

(LEDs 8–15) Zone Alarm/Option Slot and (LEDs 16–23) Zone Fault/Option Slot

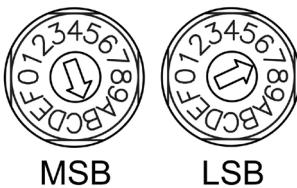
These two groups of LEDs indicate functionality of the option slot board, which depends on the type of option module that is fitted to the LSI-16. If no option slot board is installed, these LEDs will remain inactive.

LSI-16 REAR PANEL



Device ID

The rotary ID switches are located on the back of the LSI-16 and give the unit a unique Device ID. The switches are in hexadecimal format. All LSI-16 units must have a unique Device ID to function within a Vocia Paging World (i.e., it is not possible to have two LSI-16 units with the same Device ID of hex 07). To assign a Device ID of hex 07, turn the LSB switch to 7 and leave the MSB switch on 0. To create an ID of hex B7, turn the LSB switch to 7 and turn the MSB switch to B. Device ID switches should be set using a 0.1 inch (2.5mm) to 0.12 inch (3.0mm) flat blade screwdriver. More information on setting IDs and the hexadecimal numbering scheme used in Vocia can be found in the Vocia Help File.



Please note: Changes made to the Device ID while connected to the network require a power cycle in order to take effect.

Network Connection

The LSI-16 has two RJ45 Ethernet connectors. These provide redundant network capability as well as a secondary source of power (PoE). If communication is lost on either Ethernet port, the LSI-16 reports a fault. For this reason, both Ethernet ports must be connected to the Vocia network. To provide Auxiliary power PoE should be supplied to both Ethernet ports. An LED adjacent to each RJ45 connector indicates that PoE is being supplied via that port.

The RJ45 connectors utilize standard copper Ethernet cabling to interface the LSI-16 to the Vocia system via a PoE-compliant network switch. The RJ45 connector provides two LEDs that indicate Ethernet link and network activity (see table below).

Left LED	Right LED	Description
None	None	No power or data connectivity. Please check the PoE network connection.
Yellow	Flashing green	Network link established and indicates the port is currently in use.
Yellow	None	There is a network link but the port is redundant.

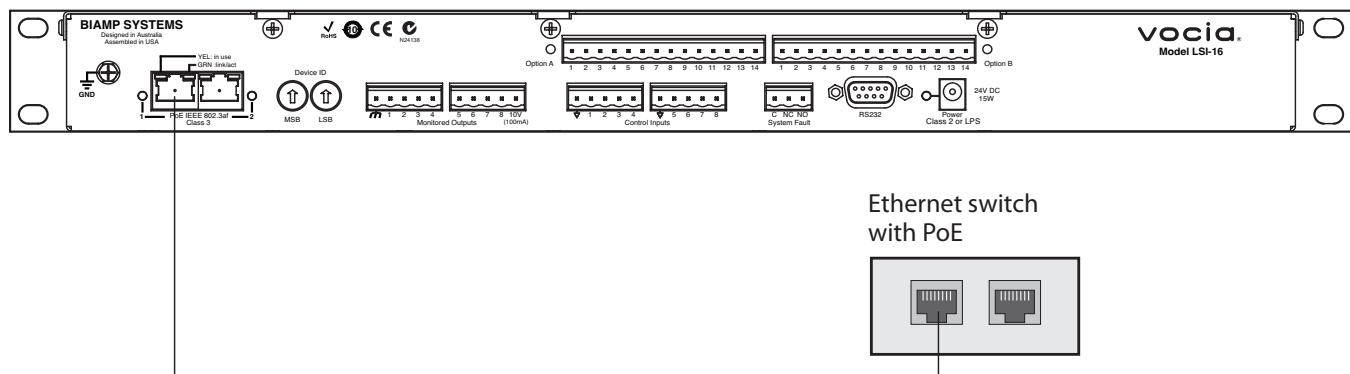
LSI-16 REAR PANEL

This connection carries control data and power over a single Ethernet cable. The maximum distance between any unit and an Ethernet switch is 328 feet (100 meters) when using copper cabling. Additional Ethernet switches and/or fiber-optic cable can be used to further extend distances between units on a network. Note: A managed Ethernet switch is required for redundant network wiring (spanning-tree configuration or similar).

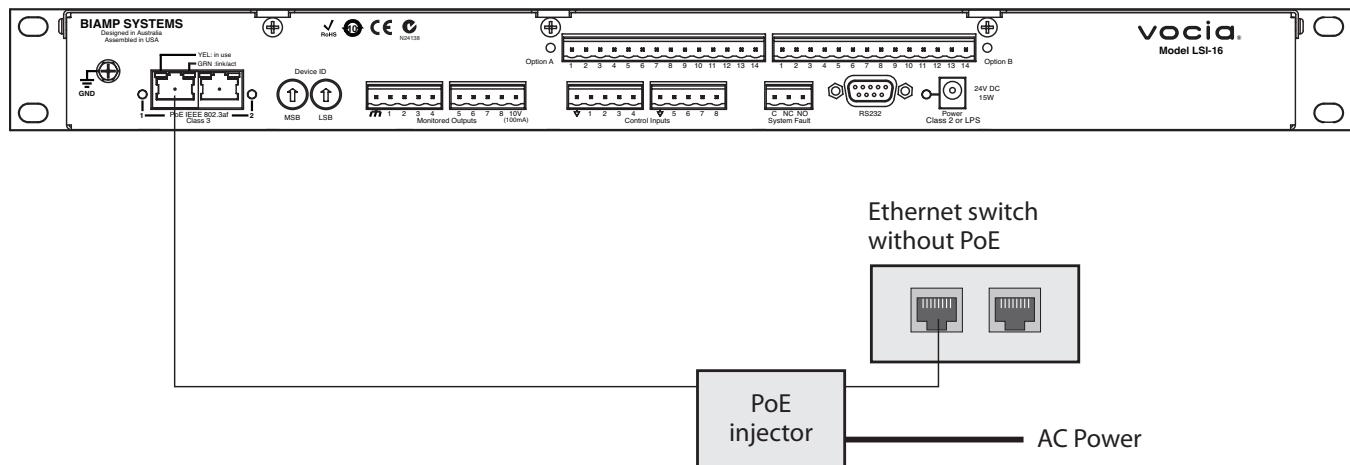
If non-Vocia network traffic shares an Ethernet switch with the Vocia network, separate VLANs must be established. All Ethernet wiring must be accomplished using shielded CAT5, CAT5e, CAT6, or CAT7 cable.

For standards-compliant systems, a managed switch with dry contact fault output is required.

LSI-16



LSI-16



LSI-16 REAR PANEL

Monitored Outputs

Two black five-position connectors are located next to the rotary switches. These are predominantly used for Monitored Outputs to external lamps or sounders. Individual connections are labeled 1 through 8 as indicated below. One connection is configured for use as both an input and an output (1) and one as an input (2) (see table below for connector assignments).

Marking	Function
/\	Ground
1	Sounder Output / Silence Input
2	System Fault Reset Input
3	Voice Alarm Active
4	General Fault
5	PSU Fault
6	Protection Fault
7	Path Fault
8	External Supply Over-voltage Monitor
10V	10V Out

The outputs will sink current (pull low) when active (see the Specifications section of this document for more details). The desired load (lamp, LED, etc.) must be connected between the output terminal and a positive voltage reference.

It should be noted that external switches and a sounder connected to the first two inputs are typically mandatory for standards compliance. The location and physical attributes of these items may be required to conform with local norms. The switches and sounder must be wired according to the connection diagram provided below.

Sounder Output / Silence Input

This connection functions as a dual purpose alarm sounder output and silence input (see connection diagram below).

Sounder Output

This output connects to a local sounder for fault and alarm warnings. A sounder is typically required for standards compliance.

Note: If an emergency microphone is located near the sounder, it may be configured in Vocia software to mute the sounder while making live announcements.

Silence Input

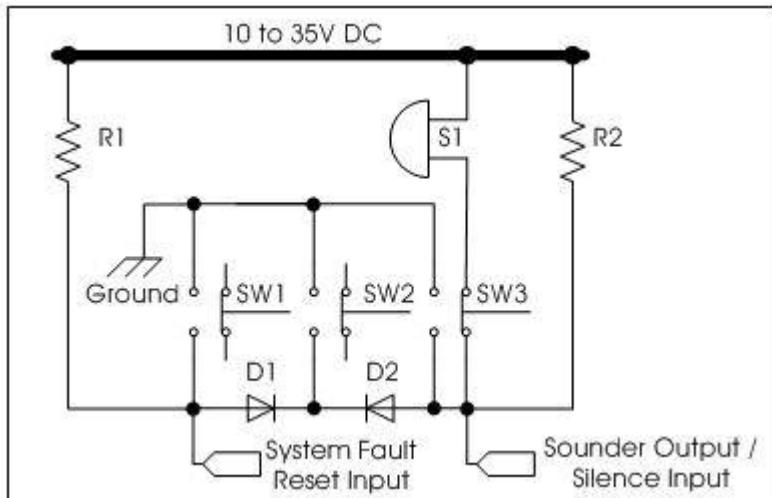
This input is used to silence the local sounder. The sounder will restart in response to any new fault or alarm.

System Fault Reset Input

This input is required to take the LSI-16 out of System Fault condition. Note: the LSI-16 will always power up in a system fault state (see connection diagram).

System Test

A system test can be initiated by simultaneously connecting monitored outputs 1 and 2 to ground (see connection diagram). A system test runs a diagnostic test, part of which illuminates each LED in turn and momentarily activates the sounder.



Connection Diagram: External Switches and Sounder (Note: 10V supply may be derived from the LSI-16 Outputs Connector)

SW1	System Fault Reset (e.g. EAO 31-453 or equivalent switch)
SW2	System Test (e.g. EAO 31-453 or equivalent switch)
SW3	Silence Local Sounder (e.g. EAO 31-453 or equivalent switch)
D1 and D2	1N4004 or equivalent general purpose 1A diode
R1 and R2	22kΩ 0.25 watt resistor
S1	Piezo (or similar) sounder - tone and sound pressure level may be required to comply with local norms

Voice Alarm Active

This output is active when messages are playing in response to an alarm input. This output provides indication of when a message is playing or when a message has been muted.

Constant active output - indicates a message is playing in response to an alarm input.

Cyclic output (1.25Hz) - indicates the message has been muted.

General Fault, PSU Fault, Protection Fault and Path Fault

These outputs will be activated by the same alarm conditions as identically named LEDs on the front panel (described above). Note however that these outputs will be activated by the faults listed above irrespective of whether a System Fault has been activated.

The Voice Alarm Active, General Fault, PSU Fault, Protection Fault and Path Fault outputs are monitored for open-circuit or short-circuit to ground or power supply and for over-voltage on the output pin (>35V DC). If incorrect conditions are detected a Fault is signaled. Output monitoring facilitates compliance with voice evacuation standards.

For each of these outputs, a load must be connected between each output and the positive voltage source. If any output on terminals 1 through 8 is unused, the output must be connected through an external resistor to the positive side of the voltage source (either 10V Out or user-supplied external source). To ensure correct functionality, the value of each resistor should be 22kΩ. An internally derived 10V source is provided at the 10V Out terminal; however, the total current available from this pin is limited to 100mA. This voltage source may be used for external devices provided the total load is less than 100mA. For higher-current devices, a user-supplied external voltage source of up to 35V may be used, with the negative side connected to the pin. Due to monitoring constraints, it is impossible to use both the internal 10V source and an external source. For monitoring purposes, the positive side of the voltage source (either 10V Out or user-supplied external source) must be connected to the External Supply Over-voltage Monitor (terminal 8), as well as supplying voltage to external devices.

LSI-16 REAR PANEL

Control Inputs

Two five-position plug-in barrier strip connectors provide control input connections. Eight separate channels plus two ground pins are provided (see table below for connector assignments). Control inputs are fully isolated from all connections in the LSI-16.

Marking	Function
▽	Ground
1	PSU Fault (contact closure indicates a PSU Fault)
2	Ethernet Fault
3	Voice Alarm Silence from CIE (common for all zones)
4	Voice Alarm Reset from CIE (common for all zones)
▽	Ground
5	Emergency Detection System Alarm 1
6	Emergency Detection System Alarm 2
7	Emergency Detection System Alarm 3
8	Emergency Detection System Alarm 4

Input Activation Conditions

Control Inputs 1 and 2

To activate an input, it must be connected to an external circuit that returns to either of the two ▽ pins. The resistance of this circuit must be less than 4kΩ.

Control Inputs 3 to 8

These inputs must be permanently connected to an external circuit that returns to either of the two ▽ pins. The resistance of this circuit must be between 1kΩ and 4kΩ. To activate an input, pull the input to a voltage between 12 and 24V.

PSU Fault

This input may be derived from the primary 24V power supply to indicate to the LSI-16 if there is a fault in the power supply.

This may be required for standards compliance.

Ethernet Fault

This input can be derived from an Ethernet switch to monitor the Ethernet network connection between the LSI-16 and amplifier. This may be required for standards compliance.

Voice Alarm Silence from CIE (fire alarm system)

This input is a signal from the CIE (fire alarm system) that will mute emergency messages in all emergency zones.

Voice Alarm Reset from CIE (fire alarm system)

This input is a signal from the CIE (fire alarm system) that will reset emergency messages in all emergency zones.

Emergency Detection System Alarm

These four inputs are used to connect to the fire alarm control and indicating equipment (CIE) and notify the LSI-16 that an alarm has occurred on a particular zone. Four such zone inputs may be connected. Additional zone inputs will be available through the option module. When an alarm is detected, the Vocia system will enter Emergency Mode as configured for that input. During Emergency Mode, some or all of the Vocia system will cease normal operation and operate as programmed for the emergency.

LSI-16 REAR PANEL

Option Slot

The option slot allows for additional modules if required by the system design. A typical option module in this slot may provide eight additional general purpose logic inputs, plus eight general purpose logic outputs.

System Fault Relay Connection

This relay is activated when the LSI-16 is fully operational. It may be used for informing external devices about the LSI-16's operating conditions or sounding an alarm that indicates the LSI-16 is not functioning reliably.

RS232

This port may be used for RS232 communication with the LSI-16 under special circumstances. Future implementations may provide enhanced features via this port.

24V DC Connector and LED

This is the primary (main) power supply input for the LSI-16 and as such must be fed from a suitable source of 24V DC capable of 15 watts (625mA). The 24V DC supply has to be sourced separately. In typical installations, this supply will be provided from a power supply compliant with local norms and required standards (typically battery-backed). The adjacent LED indicates the presence of power.

IP30 Compliance

The LSI-16 is designed for ingress protection to the IP30 standard. In order to maintain this compliance, any unused terminal connectors on the back of the unit must be fitted with the supplied terminal blocks.

LSI-16 INSTALLATION

Installation

The LSI-16 requires one 1.75 inches (44.45mm) high and 19 inches (483mm) wide rack space with 10 inches (254mm) depth. Mounting the unit using four screws with washers will prevent marring of the front panel. PVC or nylon washers are appropriate.

Please install the unit away from heat sources, such as vents and radiators, and in rooms with adequate ventilation. Ensure that air can circulate freely behind, beside, and above the unit. Do not exceed the maximum ambient operating temperature of 32-113 degrees F (0-45°C). Be aware of conditions in an enclosed rack that may cause the temperature to exceed ambient room conditions.

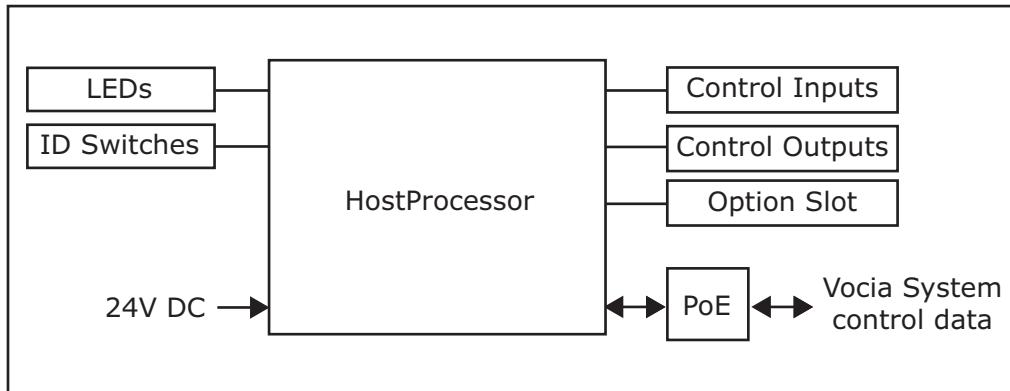
Note: To operate correctly, the LSI-16 requires input and output connections to external components and devices as described in this manual.

LSI-16 SPECIFICATIONS

Life Safety Interface 16 SPECIFICATIONS

System Fault Relay:	Single 'Form C' voltage-free SPST change-over contact	RS232 Port	
Type:		Type:	DTE
Load:	Resistive 125VAC, 60VDC	Baud Rate:	57600
Maximum operating voltage:	600mA AC, 1A DC	Connection:	RJ45 with shielded Ethernet/PoE cable (CAT5, CAT5e, CAT6, or CAT7)
Maximum operating current:	37.5VA, 30W		
Maximum switching capacity:	10µA @ 10mVDC		
Minimum permissible load:			
Parallel Control Inputs:		Power:	
Number:	Eight	Main:	24V DC 15W
Type:	Opto Isolator LED	PoE:	802.3af Class 3
Cathode presented at input – pull low to enable. Sink Current:		Base Dimensions:	
Min:	1mA	Height:	1.75 inches (44.5mm)
Max:	6mA	Width:	19 inches (483mm)
Maximum Terminal Voltage:	24V	Depth:	10 inches (254mm)
Isolation:	3kV	Weight:	Approx 6.4 lbs. (2.8kg)
Parallel Control Outputs:		Ambient Operating Temperature Range:	32-113 degrees F (0-45 degrees C)
Number:	Eight		
Type:	FET switch, open drain (low side driver)	Compliance:	EU Directive 2002/95/EC, RoHS directive CE marked
Maximum Continuous Current:	0.35A		
Current Limit:	0.8A		
Maximum External Supply:	35V		
VMon Input Shutdown:	35V		

Life Safety Interface 16 BLOCK DIAGRAM



585.0245.90A

LSI-16 WARRANTY

BIAMP SYSTEMS IS PLEASED TO EXTEND THE FOLLOWING 5-YEAR LIMITED WARRANTY TO THE ORIGINAL PURCHASER OF THE PROFESSIONAL SOUND EQUIPMENT DESCRIBED IN THIS MANUAL

1. BIAMP Systems warrants to the original purchaser of new products that the product will be free from defects in material and workmanship for a period of 5 YEARS from the date of purchase from an authorized BIAMP Systems dealer, subject to the terms and conditions set forth below.
- 2 If you notify BIAMP during the warranty period that a BIAMP Systems product fails to comply with the warranty, BIAMP Systems will repair or replace, at BIAMP Systems' option, the nonconforming product. As a condition to receiving the benefits of this warranty, you must provide BIAMP Systems with documentation that establishes that you were the original purchaser of the products. Such evidence may consist of your sales receipt from an authorized BIAMP Systems dealer. Transportation and insurance charges to and from the BIAMP Systems factory for warranty service shall be your responsibility.
3. This warranty will be VOID if the serial number has been removed or defaced; or if the product has been altered, subjected to damage, abuse or rental usage, repaired by any person not authorized by BIAMP Systems to make repairs; or installed in any manner that does not comply with BIAMP Systems' recommendations.
4. Electro-mechanical fans, electrolytic capacitors, gooseneck microphones, cords connecting handheld microphones, hard-drives, displays, and normal wear and tear of items such as paint, knobs, handles, keypads and covers are not covered under this warranty. All server-based devices are warranted for 3 years only.
5. This warranty is in lieu of all other warranties, expressed or implied. Biamp Systems disclaims all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose.
6. The remedies set forth herein shall be the purchaser's sole and exclusive remedies with respect to any defective product.
7. No agent, employee, distributor or dealer of BIAMP Systems is authorized to modify this warranty or to make additional warranties on behalf of BIAMP Systems. Statements, representations or warranties made by any dealer do not constitute warranties by BIAMP Systems. BIAMP Systems shall not be responsible or liable for any statement, representation or warranty made by any dealer or other person.
8. No action for breach of this warranty may be commenced more than one year after the expiration of this warranty.
9. BIAMP Systems shall not be liable for special, indirect, incidental, or consequential damages, including lost profits or loss of use arising out of the purchase, sale, or use of the products, even if BIAMP Systems was advised of the possibility of such damages.

COMPLIANCE

B I A M P

S Y S T E M S

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EC Declaration of Conformity

Biamp Systems Corporation, as manufacturer having sole responsibility, hereby declares that our delivered version of the following described product complies with the applicable provisions of the DIRECTIVES except as noted herein. In case of any alterations to the product not agreed upon and directed by Biamp Systems Corporation, this declaration is no longer valid.

<u>Product Model:</u>	Vocia® LSI-16
<u>Product Description:</u>	Life Safety Interface to Alarm Systems
<u>Applicable EC Directives:</u>	<u>Applicable Harmonized Standards:</u>
LVD Directive (2006/95/EC)	Safety, EN 60065:2001, Seventh Edition
EMC Directive (2004/108/EC)	Emissions, EN 55103-1:1996, Environment E2 Immunity, EN 55103-2:1996

Special Considerations for Product Environment or Compliance:

Shielded cabling must be used for system connections.

IEEE 802.3af PoE device must be CE marked.

Auxiliary 24 VDC Power Adaptor must be CE marked for IEC 60065 or IEC 60950 LPS.

Technical Documentation File Location and Contact:

Biamp Systems, Inc. phone: (503) 641-7287
10074 S.W. Arctic Drive fax: (503) 626-0281
Beaverton, OR USA 97005 e-mail: biamp@biamp.com

Authorized Representative: Larry Copley, Compliance Engineer

Authorized Signature:

A handwritten signature in black ink that reads "Larry Copley".

September 2009

Issued:

COMPLIANCE

(This information is presented to comply with the requirements of Chinese law SJ/T11363-2006)"

有害物质表
Biamp Systems Corporation
板接口 (Alarm Panel Interface)
Vocia LSI-16

部件名称	有毒有害物质或元素					
	Pb 铅	Hg 汞	Cd 镉	Cr+6 六价铬	PBB	PBDE
设备机箱 (Equipment Chassis)	X	O	X	O	O	O
插拔式接线端子 (Plug-in Terminal Blocks)	O	O	O	O	O	O
光盘(CD ROM)	O	O	O	O	O	O
手册和其他书面文档 (Manual and Paper Documents)	O	O	O	O	O	O
包装箱和所有包装材料 (Box and Packing Materials)	O	O	O	O	O	O

O : 表示该部件所有均质材料中的这种有毒有害物质低于 SJ/T11363-2006 的限制要求.

X : 表示该部件中至少有一种均质材料所含的这种有毒有害物质高于 SJ/T11363-2006 的限制要求.

在电触头和 (或) 镀镉所含的均质材料中，镉及其化合物的含量可以超过 0.01%，但欧盟指令 91/338/EEC (根据欧盟指令 76/769/EEC) 限制销售和使用某些危险物质和制剂部分中所禁止的用途除外

在以下一种或多种物质所含的均质材料中，铅及其化合物的含量可以超过 0.1%:

- 1) 电子元器件中玻璃内所含的铅
- 2) 铅在钢材中是作为一种合金元素，含量可达 0.35%
- 3) 铅在铝材中是作为一种合金元素，含量可达 0.4%
- 4) 铅在铜材中是作为一种合金元素，含量可达 4%
- 5) 高熔点类焊料中的铅 (即铅料合金，铅含量超过 85%)
- 6) 电子陶瓷部件内的铅
- 7) 由两种以上元素组成的焊料中所含的铅，用于连接针脚和微处理器包装，其中铅的含量超过 80% 但低于 85%
- 8) 顺应针连接系统内的铅
- 9) 倒装芯片封装中半导体芯片及载体之间形成可靠连接所用焊料中的

在正常使用情况下，中国环保使用期限为 10 年，条件是：



- 环境温度为 0-40C (32-104°F)
- 湿度为 0-95%，无凝结
- 海拔高度为 0-10,000 英尺
- 气流不受阻碍
- 没有水或其他液体进入任何部件
- 电源为 110-120/220-240 V , 50/60 Hz
- 部件没有损坏 (损坏部件应立即修理)
- 由工厂授权人员使用批准的材料进行所有维修

EU RoHS COMPLIANT



This Biamp product, including all attendant cables and accessories supplied by Biamp, meets all requirements of EU Directives 2002/95/EC of January 27, 2003, and 2005/618/EC of August 18, 2005, the EU RoHS Directives. An EU RoHS Materials Content Declaration document may be obtained at www.biamp.com